

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE August 15, 1977
 SUBJECT Big River Intensive Survey, Missouri
 FROM Steven W. Sisk *W. Sisk*
 Hydrologist, Water Section, SVAN-TECH
 TO Files

Lorenz

SITE	BIG RIVER MINE
ID#	MD981126899
BREAK	16
CIR	AR
	8-15-77

Dr Carl Bailey *Carl Bailey*
 Microbiologist, SVAN-LABO

CAB

An intensive survey of the Big River between the City of Leadwood and Washington State Park in Eastern Missouri, was requested by the Missouri Department of Natural Resources in January 1977 (see attachment). A study conducted in the mid 1960's by state personnel indicated that approximately 40 miles (60 kilometers) of the subject stream segment had been degraded as evidenced by poor species diversity, while water chemistry data proved inconclusive. The land areas in the vicinity of Leadwood and areas downstream have been extensively mined for lead and barium since the late 1800's.

A reconnaissance of the study area was performed in June of 1977 to make a preliminary assessment of the stream quality and to familiarize investigative personnel with the problem. Water samples were collected primarily for nutrient and heavy metals analyses. Biological observations were made and two stream substrate samples were collected for evaluation of possible toxic leachate.

The results of the June reconnaissance indicated that the unstable and shifting mine tailings deposits on the stream bottom was the mostly likely explanation for the depressed species diversity. A 72-hour toxicity test of the stream substrates with Daphnia magna did not indicate the presence of a toxic leachate. Observations of algal growths and water quality data along the river suggested that algal populations may be nutrient limited.

The intensive survey is designed to assess these hypothesis in relation to the specific points (a,b,c) addressed in the January 12, 1977, letter from the Missouri Department of Natural Resources.

The intensive survey will consist of collecting water, algal assay, periphyton and macroinvertebrate samples. The survey will be conducted in three stages which will take place on the following dates:

Stage #1	August 22-26, 1977
Stage #2	September 6-8, 1977
Stage #3	September 20-22, 1977



Stage 1

The first stage of the intensive survey will include the collection of qualitative and quantitative biological samples, water samples, algal assay samples and the placement of artificial substrate samples for periphyton and macroinvertebrates

Quantitative macroinvertebrate samples will be collected with a Surber sampler and qualitative samples will be collected with a kick screen at stations BG-9 and BG-5 This element of the survey will provide information to determine if the zone of degradation has extended downstream

The following analyses will be requested on all water samples

✓ Conductivity	✓ Total Alkalinity
Total Soluble Carbon	✓ Total Hardness
pH	✓ Calcium
✓ Magnesium	✓ Total Soluble Phosphorus OPA ⁻
✓ Dissolved Iron	✓ Inorganic Nitrogen
✓ Organic Nitrogen TN	Lead
Barium	Zinc
Cadmium	Mercury
Copper	Chromium
Nickel	✓ Boron

The water chemistry data will be used to document possible toxic effects as well as the initial nutrient concentrations for the algal assay test.

The two gallons of water from stations BG-1, BG-3 and BG-5 will be collected for use in an algal assay. The purpose of the algal assay is to determine if the stream segment in the study area is nutrient limited.

Periphyton and macroinvertebrate artificial substrate samplers will be set in at BG-1, BG-2, BG-3, BG-4, BG-5 and BG-6 The purpose of this test is to determine if periphyton and macroinvertebrate species diversities are the same in the upstream control station (BG-1) as in the downstream areas if provided with identical substrates.

The sample stations are located as follows

<u>Station</u>	<u>Location</u>
BG-1	Big River at Highway 8 approximately 2 1/2 miles west of Leadwood, Missouri

BG-2 5	Big River at low water crossing at NW ¼ of section 35, T35N, R 4E
BG-3	Big River at Old Bonne Terre Road Bridge approximately 0.5 miles north of the northwest edge of Desloge, Missouri
BG-4	Big River at County Road "K" approximately 2 miles east of Bonne Terre, Missouri
BG-5	Big River at County Road "E"
BG-6	Big River at ford approximately 0.5 miles past the end of Dickman Road (southwest corner of section 17 of T38N and R4E)
BG-9	Big River at State Road 21 near Washington State Park

All samples collected during stage 1 of this study will be delivered to the laboratory by COB August 26

Stage 2

This stage of the survey will be conducted during the period September 6-8, 1977. The periphyton artificial substrate samplers will be recovered at this time.

Stage 3

Stage three of the survey will take place September 20-22, 1977. It will consist of collecting the macroinvertebrate artificial substrate samplers.

Manpower requirements for the field work are as follows:

Stage #1	10 man-days - August 22-26
Stage #2	6 man-days - September 6-8
Stage #3	6 man-days - September 20-22

As previously arranged with the Laboratory Branch, Bruce Littell and Leo Mosby will complete the field work for all three stages.

Due to access problems at some of the sample stations, it will be necessary to use a four-wheel drive vehicle. For this purpose, the Scout (G61-7267) will be reserved for the sampling dates

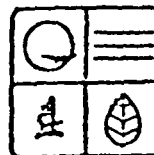
2 Attachments

Letter dated 1/12/77 from Mo DNR
Map - charting sampling areas

cc William J. Keffer
Thomas Lorenz
Robert Markey thru GES
Leo Reading
Bruce Littell
Leo Mosby
Jim Jong, Mo DNR 3-Long
Douglass Edwards, Mo DNR
Lee Duval

bcc Steven Sisk
Dr Carl Bailey

Joseph P. Teasdale
Governor



Proceed with PLAN
Took L's change - get
Her 1 photos
of study area
This is really
rural country

missouri department of natural resources

2010 Missouri Blvd

P.O. Box 1368

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January 12, 1977

Mr. Robert L. Markey, Director
Surveillance and Analysis Division
Environmental Protection Agency
25 Funston Road
Kansas City, Kansas 66115

Dear Mr. Markey--

Following a spring 1976 meeting with your Wastewater Section personnel, we recommended the Dry Sac - Little Sac Rivers near Springfield, Missouri as the subject of a survey to be conducted by the Environmental Protection Agency during FY 1977 (see attached letter). Our recommendation was based on the belief that you were looking for a stream segment in which water quality improvements could be documented. It now appears that there was a misunderstanding of your goals and we would like to rescind that recommendation.

It is now our understanding that your Surveillance and Analysis Division will consider performing a water quality related survey for the purpose of assisting the State in the accomplishment of its goals. In this regard, I offer the following recommendation.

The Big River between the city of Leadwood and Washington State Park in St. Francois County, Missouri is affected by past mining activities in the area. A study conducted in the mid-1960's confirmed that a stretch of approximately 40 miles is degraded as evidenced by poor species diversity. In order to assess the present condition, the Water Quality Management Basin Plan for Upper Mississippi-Meramec River Basin recommends a study. The scope of this study is to evaluate

- a) if the contaminated stretch has extended downstream,
- b) the validity of the hypothesis that the degradation was caused by substrate contamination,
- c) the overall impact of seepage and runoff on water quality.

It is suggested that a sampling program be undertaken in the spring months for physical, chemical and biological data in addition to sediment analysis.

For further information and details regarding this request, please contact V. Ramalah of this office.